

Radiative Lifetimes and Transition Probabilities in Rh I

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Rhodium is one of the refractory elements observed in the solar photosphere and in meteorites [1]. To determine abundances the intrinsic transition probability (A -value) or oscillator strength (f -value) must be known for the observed lines. Radiative lifetimes of 17 high-lying excited states in Rh I are measured using the Time-Resolved, Laser-Induced Fluorescence (TR-LIF) method. Out of these lifetimes, 13 are new and the remaining four confirm previous TR-LIF measurements [2,3]. Furthermore, we report the first theoretical investigation of Rh I, where the radiative decay properties of all experimentally known levels below 47000 cm⁻¹ are calculated using a pseudo-relativistic Hartree-Fock method including core polarization effects. The theoretical calculations are found to be in very good agreement with the experimental results. A large set of new transition probabilities is presented for lines of astrophysical interest in the spectral range 2200 – 10000 Å.

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